

## **REMARKS**

In response to the February 4, 2008 Office Action, claims 1, 2, 6, 7, 10-12, and 14 are amended, claims 3 and 9 are cancelled, and new claims 16-20 are added. Claims 1-15 were rejected under 35 U.S.C. § 112, 1<sup>st</sup> paragraph, claims 2-11 under 35 U.S.C. § 112, 2<sup>nd</sup> paragraph, claims 1, 2, 4, 5, 8, 9, and 12-15 under 35 U.S.C. § 102(b) and claims 1-15 under 35 U.S.C. § 103(a). Each of these rejections is discussed below.

### **I. Claim Amendments**

As mentioned above, claims 1, 2, 6, 7, 10-12, and 14 are amended herein. Specifically:

Claims 1, 2, 12, and 14 are amended to reflect the composition consists of a mixture which is formulated as a liquid for direct application to a cotton plant. This amendment can be supported by Applicant's specification at, for example, page 2, lines 10-13. These claims are also amended to indicate the percentages of acid and phosphonic compounds as 1% to 40% and 10% to 20%, respectively. This amendment can be supported by Applicant's specification at, for example, page 6, lines 5 and 6.

Claim 2 is further amended to describe the steps for increasing the efficiency and efficacy of phosphonic compounds in controlling cotton plant defoliation. Step (a) can be supported by claim 2 as originally filed; and steps (b) and (c) can be supported by Applicant's specification at, for example, page 6, lines 6-7.

Claims 2 and 14 are amended to indicate increased efficiency and efficacy of phosphonic compounds in controlling cotton plant defoliation. This amendment can be supported by, for example, claim 7 as originally filed. Claim 14 is further amended to indicate the boll opening efficiency of the phosphonic compound is increased. This amendment can be supported by, for example, claim 6 as originally filed.

New claims 16-20 are added herein. Specifically:

New claims 16 and 17 are directed to the pH of the mixture in claim 1, and the composition formed in step (b) of claim 2, respectively. These claims can be supported by Applicant's specification at, for example, page 2, lines 3-4 and lines 10-13.

New claim 18 depends from claim 2 and is directed to the rate of application of the mixture. This claim can be supported by, for example, page 6, Table 1.

New claims 19-20 depend from claims 1 and 2, respectively, and are directed to the additional ingredients that may be present in the composition. This amendment can be supported by, for example, page 5, last paragraph.

## **II. Rejection of Claims Under 35 U.S.C. § 112, 1<sup>st</sup> Paragraph**

The Examiner rejected claims 1-15 as allegedly failing to comply with the written description requirement. In particular, the Examiner asserts the “feature that the phosphonic compound is ‘co-formulated with’ the acid ‘prior to direct application by spraying’” is not found in the originally filed disclosure. Applicant believes the claims as amended address the Examiner’s concerns and respectfully requests withdrawal of the rejection.

Further, the Examiner asserts the pH recited in claims 10 and 11 is not found in the previously filed claims. Applicant believes claims 10 and 11 as amended address the Examiner’s concerns.

## **III. Rejection of Claims Under 35 U.S.C. § 112, 2<sup>nd</sup> Paragraph**

The Examiner rejected claims 2-11 as indefinite. Specifically, the Examiner asserts there is an internal inconsistency in claim 2 regarding whether the direct spraying is required. Applicant believes claim 2 as amended addresses the Examiner’s concerns and respectfully requests withdrawal of the rejection.

## **IV. Rejection of Claims Under 35 U.S.C. § 102(b)**

### **A. CN 1252940**

The Examiner rejects claims 1, 2, 4, 5, 8, and 9 as anticipated by CN 1252940. For at least the following reason, Applicant respectfully requests withdrawal of this rejection.

CN 1252940 discloses a mixture of 1-50% ethephon and 0.5-10% imidacloprid which purportedly functions both as an insecticide and as a plant growth regulator. See Translation,

sentence bridging pages 10 and 11. The mixture is prepared by dissolving imidacloprid in acid (sulfuric or hydrochloric acid, 1-100%) prior to addition of the ethephon and cosolvent. An emulsification dispersant is then added and the temperature set to 50-60°C. Water at 70-80°C is added and the solution stirred for 10 minutes.

The MPEP teaches the following:

When the prior art discloses a range which touches or overlaps the claimed range, but no specific examples falling within the claimed range are disclosed, a case by case determination must be made as to anticipation. In order to anticipate the claims, the claimed subject matter must be disclosed in the reference with "sufficient specificity to constitute an anticipation under the statute." What constitutes a "sufficient specificity" is fact dependent. If the claims are directed to a narrow range, and the reference teaches a broad range, depending on the other facts of the case, it may be reasonable to conclude that the narrow range is not disclosed with "sufficient specificity" to constitute an anticipation of the claims. See, e.g., *Atofina v. Great Lakes Chem. Corp.*, 441 F.3d 991, 999, 78 USPQ2d 1417, 1423 (Fed. Cir. 2006) wherein the court held that a reference temperature range of 100-500 degrees C did not describe the claimed range of 330-450 degrees C with sufficient specificity to be anticipatory. Further, while there was a slight overlap between the reference's preferred range (150-350 degrees C) and the claimed range, that overlap was not sufficient for anticipation. "[T]he disclosure of a range is no more a disclosure of the end points of the range than it is each of the intermediate points." *Id.* at 1000, 78 USPQ2d at 1424. Any evidence of unexpected results within the narrow range may also render the claims unobvious. The question of "sufficient specificity" is similar to that of "clearly envisaging" a species from a generic teaching. See MPEP § 2131.02. (*emphasis provided*)

Applicant's claim 1 as amended is directed to a composition consisting essentially of 1 to 40% acid and 10 to 20% phosphonic compounds. Though CN 1252940 mentions a range from 1-50% ethephon, no specific examples falling with Applicant's claimed range are disclosed. In fact, 40% ethephon is the only % mentioned with any specificity in the publication. See Translation, Examples 1-3. Thus, "sufficient specificity" must be shown to constitute anticipation. The 1-50% ethephon mentioned in the publication is a broad range, while Applicant's claimed range of 10% to 20% phosphonic compounds is narrow, thus the claimed percentage is not shown with any specificity, much less "sufficient specificity". Therefore, at

least because CN 1252940 fails to provide Examples of compositions containing between 10% and 20% ethephon and fails to described with "sufficient specificity" Applicant's claimed percentage ethephon, Applicant's claim 1 is not anticipated.

New claims 16 and 19 depend from claim 1 and are not anticipated for at least the same reasons as discussed above with respect to claim 1.

Applicant's claim 2 as amended is directed to a method of increasing efficiency and efficacy of phosphonic compounds by preparing a composition consisting essentially of 1 to 40% acid and 10 to 20% phosphonic compounds, mixing the composition with water to form an application solution, and applying the application solution to a cotton plant thereby controlling cotton defoliation. As discussed above with respect to claim 1, at least because CN 1252940 fails to provide Examples of compositions containing between 10% and 20% ethephon and fails to described with "sufficient specificity" Applicant's claimed percentage ethephon, Applicant's claim 2 is not anticipated.

Claims 4, 5, and 8 depend from claim 2 and are not anticipated for at least the same reason as discussed above with respect to claim 2. Likewise, new claims 17, 18, and 20 are not anticipated as these claims depend from claim 2.

B. CN 1302545

The Examiner rejects claims 1, 2, 4, and 12-15 as anticipated by CN 1302545. For at least the following reason, Applicant respectfully requests withdrawal of this rejection.

CN 1302545 discloses controlled release paste compositions allegedly useful in promoting disease resistance and improved yield in rubber trees.

Applicant's claim 1 as amended is directed to a liquid formulation for direct application to a cotton plant. Because CN 1302545 fails to disclose a composition in liquid formulation, Applicant's claim 1 is not anticipated.

New claims 16 and 19 depend from claim 1 and are not anticipated for at least the same reasons as discussed above with respect to claim 1.

Applicant's claim 2 as amended is directed to a method of increasing efficiency and efficacy of phosphonic compounds using a composition containing phosphonic compounds in a

liquid formulation for direct application to a cotton plant. As discussed above with respect to claim 1, because CN 1302545 fails to disclose a composition in a liquid formulation, Applicant's claim 1 is not anticipated.

Claim 4 depends from claim 2 and is not anticipated for at least the same reason as discussed above with respect to claim 2. Likewise, new claims 17, 18, and 20 are not anticipated as these claims depend from claim 2.

Applicant's claim 12 as amended is directed to a composition containing phosphonic compounds and phosphonic acid in a liquid formulation for direct application to a cotton plant. As discussed above with respect to claim 1, because CN 1302545 fails to disclose a composition in a liquid formulation, Applicant's claim 1 is not anticipated.

Claim 13 depends from claim 12 and is not anticipated for at least the same reason as discussed above with respect to claim 12.

Applicant's claim 14 as amended is directed to a method of increasing the efficiency and efficacy of phosphonic compounds in controlling cotton plant defoliation using a composition containing phosphoric acid and one or more phosphonic compounds, wherein the mixture is formulated as a liquid for direct application to a cotton plant. As discussed above with respect to claim 1, because CN 1302545 fails to disclose a composition in a liquid formulation, Applicant's claim 14 is not anticipated.

Claim 15 depends from claim 14 and is not anticipated for at least the same reason as discussed above with respect to claim 14.

#### **V. Rejection of Claims Under 35 U.S.C. § 103(a)**

The Examiner bears the burden of establishing a *prima facie* case of obviousness under 35 U.S.C. § 103. In determining obviousness, one must focus on Applicant's invention as a whole. *Symbol Technologies Inc. v. Opticon Inc.*, 19 USPQ2d 1241,1246 (Fed. Cir. 1991). The primary inquiry is:

whether the prior art would have suggested to one of ordinary skill in the art that this process should be carried out and would have had a reasonable likelihood of success . . . Both the suggestion and the expectation of success must be found in the prior art, not in the applicant's disclosure.

*In re Dow Chemical*, 5 USPQ2d 1529, 1531 (Fed. Cir. 1988). To establish obviousness, both the elements of the claimed invention plus the motivation to combine the elements must be present in the prior art. *Ex parte Hiyamizu*, 10 USPQ2d 1393, 1394 (PTO Bd. App. Intf., 1988).

A. CN 1252940 in view of the Agrochemicals Handbook, the Farm Chemicals Handbook '98, Fritz et al. (U.S. 3,879,188), and CABA abstract No. 80:49077

The Examiner rejects claims 3, 6, 7, and 9-11 as obvious over CN 1252940 in view of the Agrochemicals Handbook, the Farm Chemicals Handbook '98, Fritz et al. (U.S. 3,879,188), and CABA abstract No. 80:49077. Applicant respectfully requests withdrawal of this rejection.

As discussed above, CN 1252940 discloses a mixture of ethephon and imidacloprid prepared by dissolving imidacloprid in acid (sulfuric or hydrochloric acid) prior to addition of the ethephon and cosolvent. As the Examiner points out, CN 1252940 does not expressly disclose the combination of ethephon and an acid at a pH between 1 and 3. In fact, it is understood that any acid mentioned in the publication is used for the purpose of dissolving imidacloprid, implicitly teaching away from Applicant's claimed liquid mixture of phosphonic compounds and an acid. Thus, there would be no expectation that the use of acid in the absence of imidacloprid would be useful for any purpose, much less that the use of a phosphonic compound formulated with hydrochloric acid, nitric acid, phosphoric acid, phosphorus acid, polyphosphoric acid, or perchloric acid would be more efficacious and efficient than the phosphonic compound alone.

The Agrochemicals Handbook fails to mitigate the deficiency of CN 1252940. This publication purportedly provides ethephon is stable in aqueous solutions having pH values less than 3.5 and is useful to regulate phases of plant growth. However, knowledge that addition of an acid to ethephon promotes stability fails to teach or suggest a phosphonic compound formulated with hydrochloric acid, nitric acid, phosphoric acid, phosphorus acid, polyphosphoric acid, or perchloric acid would be more efficacious and efficient than the phosphonic compound alone.

Similarly, the Farm Chemical Handbook fails to teach or suggest the element lacking in CN 1252940. The Farm Chemical Handbook mentions ethephon as a plant growth regulator having stability under pH 3. Again, knowledge that addition of an acid to ethephon promotes

stability fails to teach or suggest a phosphonic compound formulated with hydrochloric acid, nitric acid, phosphoric acid, phosphorus acid, polyphosphoric acid, or perchloric acid having greater efficacy and efficiency than the phosphonic compound alone.

The Examiner cites Fritz *et al.* as teaching addition of an acid to ethephon for stability. Fritz *et al.*, column 9, last sentence, through column 10, line 6, reads as follows:

The phosphonic derivatives may be stabilized against water or moisture incorporating an acid therein to insure that the pH is not greater than five, with the term "acid" being used to cover any material which will impart the desired pH value. Also, an appropriate buffering-agent can be used to maintain the pH of the composition at five or less.

As Applicant pointed out in the October 19, 2007 Communication, it is not well known that phosphonic compounds can be reliably formulated into an aqueous formulation with an acid for direct application to a cotton plant. Citing Volgas *et al.* (U.S. 2007/0037707), Applicant demonstrated that acids used to modify pH of spray solutions are added separately to the spray solution by the end user. In other words, an acid is used as a "tank mix additive". See Volgas *et al.*, paragraphs 4-7. Fritz *et al.* fail to expressly disclose the combination of phosphonic compounds with an acid. Of the numerous examples provided, none give any hint at a need for addition of an acid at any point. Further, Fritz *et al.* do not mention a phosphonic compound formulated with hydrochloric acid, nitric acid, phosphoric acid, phosphorus acid, polyphosphoric acid, or perchloric acid having greater efficacy and efficiency than the phosphonic compound alone. Thus, Fritz *et al.* fail to make up the deficiency in CN 1252940.

The Examiner cites CABA abstract 80:49077 as purportedly mentioning "foliar spray of ethephon for boll opening and increasing the yield of cotton". This publication fails to teach or suggest a phosphonic compound formulated with hydrochloric acid, nitric acid, phosphoric acid, phosphorus acid, polyphosphoric acid, or perchloric acid having greater efficacy and efficiency than the phosphonic compound alone.

Applicant's claim 1 as amended is directed to a formulation of one or more phosphonic compounds formulated with hydrochloric acid, nitric acid, phosphoric acid, phosphorus acid, polyphosphoric acid, or perchloric acid having greater efficacy and efficiency than the

phosphonic compound alone. See Applicant's specification, Table 1, showing greater efficacy than would be anticipated for the combination of ethephon and muriatic acid. At least because none of the above publications, alone or in combination, teach or suggest this combination, claim 1 is not obvious. Claim 10 depends from claim 1 and is non-obvious for at least this same reason. New claims 16 and 19 depend from claim 1 and are non-obvious for at least this same reason.

Applicant's claim 2 as amended is directed to a method of increasing efficiency and efficacy of phosphonic compounds by formulating phosphonic compounds in combination with hydrochloric acid, nitric acid, phosphoric acid, phosphorus acid, polyphosphoric acid, or perchloric acid having greater efficacy and efficiency than the phosphonic compound alone (as shown in Table 1 of Applicant's specification). At least because none of the above publications, alone or in combination, teach or suggest this combination, claim 2 is not obvious. Claims 3 and 9 are cancelled, thus mooting the objection as to those claims. Claims 6, 7, and 11 depend from claim 2 and are non-obvious for at least this same reason. New claims 17, 18, and 20 depend from claim 2 and are non-obvious for at least this same reason.

B. Fritz *et al.* in view of the CABA abstract 80:49077, the Agrochemicals Handbook, the Farm Chemicals Handbook, and CN 1252940

The Examiner rejects claims 1-15 as obvious over Fritz *et al.* in view of the CABA abstract 80:49077, the Agrochemicals Handbook, the Farm Chemicals Handbook, and CN 1252940. Applicant respectfully requests withdrawal of this rejection.

The Examiner asserts the difference between Applicant's claimed subject matter and Fritz *et al.* is that the latter does not expressly disclose the combination of phosphonic compounds and an acid. Applicant agrees that this is one difference, but adds that as phosphonic compounds are commonly prepared at a pH below 3.5, one would not have anticipated a greater efficacy and efficiency by merely formulating phosphonic compounds with hydrochloric acid, nitric acid, phosphoric acid, phosphorus acid, polyphosphoric acid, or perchloric acid. In other words, it would have been expected that addition of an acid to phosphonic compounds would result in the same efficacy and efficiency. Further, even at the time Volgas *et al.* was filed, almost 3 years later, it was understood that addition of acid to ethephon was performed in the



tank rather than as a formulation. This was not a matter of convenience; instead the additional step of adding the acid to the tank mix *inconveniences* the end-user. It was Applicant who recognized this was a problem, an inefficiency, and Applicant who determined in the face of contrary evidence that certain acids when added to phosphonic compounds as a pre-mix not only improved stability but also improved efficacy and efficiency. So, in opposition to the Examiner's assertion that one of skill in the art would have been motivated to co-formulate ethephon with an acid in order to maintain a pH below 3.5 or less, Applicant's determination that mineral acids in formulation with phosphonic acids improved stability as well as efficacy and efficiency is actually surprising and certainly non-obvious.

Similarly, as the Examiner points out on page 10, first complete paragraph of the Office action, CN 1252940 does not expressly disclose formulations containing phosphonic compounds and an acid having a pH between 1 and 3. Applicant adds that, as stated above, phosphonic compounds are commonly prepared at a pH below 3.5, thus one would not have anticipated a greater efficacy and efficiency by merely formulating phosphonic compounds with hydrochloric acid, nitric acid, phosphoric acid, phosphorus acid, polyphosphoric acid, or perchloric acid.

CABA abstract 80:49077 mentions a foliar spray purportedly effective in increasing boll opening and yield in cotton plants. No teaching or suggestion is provided regarding formulating phosphonic compounds with hydrochloric acid, nitric acid, phosphoric acid, phosphorus acid, polyphosphoric acid, or perchloric acid.

The Agrochemicals Handbook mentions ethephon is involved in regulating plant growth processes and is stable in aqueous solutions where the pH is less than 3.5. No teaching or suggestion is provided regarding formulating phosphonic compounds with hydrochloric acid, nitric acid, phosphoric acid, phosphorus acid, polyphosphoric acid, or perchloric acid.

The Farm Chemicals Handbook mentions use of ethephon as a plant growth regulator and mentions stability of the compound when the pH is 3 or less. No teaching or suggestion is provided regarding formulating phosphonic compounds with hydrochloric acid, nitric acid, phosphoric acid, phosphorus acid, polyphosphoric acid, or perchloric acid.

As previously discussed, Applicant's claim 1 as amended is directed to a formulation of one or more phosphonic compounds formulated with hydrochloric acid, nitric acid, phosphoric

acid, phosphorus acid, polyphosphoric acid, or perchloric acid having greater efficacy and efficiency than the phosphonic compound alone. This formulation is prepared as a complete pre-mix. See Applicant's specification, Table 1, showing greater efficacy than would be anticipated for the combination of ethephon and muriatic acid. At least because none of the above publications, alone or in combination, teach or suggest this combination, claim 1 is not obvious.

Claim 10 depends from claim 1 and is non-obvious for at least this same reason. New claims 16 and 19 depend from claim 1 and are non-obvious for at least this same reason.

Applicant's claim 2 as amended is directed to a method of increasing efficiency and efficacy of phosphonic compounds by formulating phosphonic compounds with hydrochloric acid, nitric acid, phosphoric acid, phosphorus acid, polyphosphoric acid, or perchloric acid (as shown in Table 1 of Applicant's specification). At least because none of the above publications, alone or in combination, teach or suggest this combination, claim 2 is not obvious.

Claims 3 and 9 are cancelled, thus mooting the objection as to those claims. Claims 4-8 and 11 depend from claim 2 and are non-obvious for at least this same reason. New claims 17, 18, and 20 depend from claim 2 and are non-obvious for at least this same reason.

Applicant's claim 12 as amended is directed to one or more phosphonic acids formulated with phosphoric acid having greater efficacy and efficiency than the phosphonic compound alone. At least because none of the above publications, alone or in combination, teach or suggest this combination, claim 12 is not obvious.

Claim 13 depends from claim 12 and is non-obvious for at least the same reason as discussed above with respect to claim 12.

Applicant's claim 14 as amended is directed to increasing efficiency and efficacy of phosphonic compounds in controlling cotton plant defoliation by formulating phosphonic compounds in combination with phosphoric acid. At least because none of the above publications, alone or in combination, teach or suggest this combination, claim 14 is not obvious.

Claim 15 depends from claim 14 and is non-obvious for at least the same reason as discussed above with respect to claim 14.

Lastly, the Examiner originally cited Volgas *et al.* as evidence of the current state of the art, even though the application was filed almost three years after the present application.

Applicant merely points out that, even after Applicant's application was filed, the state of the art was such that it was unpredictable as to whether a particular adjuvant could be formulated with a phosphonic compound. As a result, acids are used as tank mix additives for addition to the phosphonic acid spray solution and are not formulated as a pre-mix. See Volgas *et al.*, paragraph 7, last sentence. This is not contrary to the teachings in Applicant's specification. Applicant points out that a formulation of phosphonic compounds with an acid will increase the breakdown into ethylene and increase the speed of development in a target plant. See Applicant's specification at page 2, lines 8-14. Thus, no contradictory teachings were presented.

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Applicant believes that the pending claims are in condition for allowance. If it would be helpful to obtain favorable consideration of this case, the Examiner is encouraged to call and discuss this case with the undersigned.

This constitutes a request for any needed extension of time and an authorization to charge all fees therefore to deposit account No. 19-5117, if not otherwise specifically requested. The undersigned hereby authorizes the charge of any fees created by the filing of this document or any deficiency of fees submitted herewith to be charged to deposit account No. 19-5117.

Respectfully submitted,

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